

means for producing, from the sensed typing gestures, gesture associated textual output said producing means including a computer and processes running on the computer to capture gesture images, to classify each gesture image into one of a plurality of classes, and associate each of the classes with one of the keys of the virtual keyboard.

REMARKS

In the Office Action, the Examiner rejected Claims 1-22, which are all of the pending claims, under 35 U.S.C. §103 as being unpatentable over the prior art. In particular, Claims 1-3, 7, 8, 10-13 and 17-20 were rejected as being unpatentable over U.S. Patent 5,767,842 (Korth) in view of U.S. Patent 6,407,679 (Evans, et al.). Claims 4-6, 9, 14-16, 21 and 22 were rejected as being unpatentable over Korth in view of Evans, et al. and further in view of U.S. Patent 6,421,453 (Kanevsky).

Applicants herein request that independent Claims 1, 8, 10 and 17 be amended to emphasize differences between the claims and the prior art.

The present invention relates to a method and system for typing using a virtual keyboard. In accordance with the invention, a person moves his or her fingers as if that person was typing, and computer processes translate that movement into text, as if the person were using a real keyboard. More specifically, these processes capture gesture images, classify each gesture into one of a plurality of classes based on the movement of the gesture, and associate each of these classes with one of the keys of the virtual keyboard.

In rejecting the claims over the prior art, the Examiner noted that Korth does not disclose classifying gestures into classes and associating each of those classes with one of the keys of the keyboard. The Examiner argued, however, that Evans, et al. teaches the use of a glove in a

virtual environment, where groups of gestures are classified and movement of each finger of the glove may be associated with the keys of a virtual keyboard.

There is a very important difference between the classification procedure disclosed in Evans, et al. and the classification procedure used in the present invention. In particular, with the Evans, et al. procedure, movement of a finger is always initially associated with the same value, while with this invention, movement of the same finger may be initially associated with different values depending on the relative movement of the finger.

In the Evans, et al. procedure, each finger is associated with the one particular value, and a key sequence, such as "23944" is obtained by sensing the sequence of the finger movement. That sequence is then matched, using probability analysis, to a word in a dictionary. With the present invention, different movements of even the same finger may be associated with different values, such as "c," "d," or "e."

The procedure of the present invention is of utility for a number of reasons. First, with the present invention, it is not necessary to provide the dictionary used in Evans, et al. to match finger sequences with words. With the present invention, the finger gestures themselves can be used to spell out words or to determine the most probable word from what is spelled out. Second, again because it is not necessary, with this invention, to match finger sequences with words in a given dictionary, the present invention, as a practical matter, can be used with a substantially larger vocabulary than can the procedure of Evans, et al.

Applicants herein request that Claims 1, 8, 10 and 17 be amended to emphasize the above-discussed aspect of the invention. Specifically, each of these claims is being amended to indicate that the computer processes classify each gesture image into one of a plurality of classes

depending on the movement of the gesture, and associate each of these classes with one of the keys of the virtual keyboard.

The other references of record have been reviewed, and they are believed to be no more pertinent than the above-discussed references. In particular, these other references also fail to disclose or suggest the principal of classifying gestures into one of a plurality of classes depending on the movement of the gesture, and associating each class with one of the keys of the keyboard.

Because of the above-discussed differences between Claims 1, 8, 10 and 17 and the prior art and because of the advantages associated with those differences, these claims patentably distinguish over the prior art and are allowable. Claims 2-7 are dependent from, and are allowable with, Claim 1, and Claim 9 is dependent from Claim 8 and is allowable therewith. Also, Claims 11-16 are dependent from, and are allowable with, Claim 10, and Claims 18-22 are dependent from Claim 17 and are allowable therewith.

It is noted that the amendments requested herein only emphasize differences between the claims and the prior art. For example, Claim 1 presently includes the limitation that the computer processes classify groups of gestures into classes, and the changes requested herein only describe this feature more particularly. Also, the requested amendments are being made to more clearly identify the differences between the claims and Evans, et al, which was cited for the first time in the latest Office Action. Accordingly, Applicants submit that entry of this Amendment is appropriate and such entry is respectfully requested.

In addition to the foregoing, the rejection of Claims 4-6, 9, 14-16, 21 and 22 under 35 U.S.C. §103 is respectfully traversed on the grounds that Kanevsky, et al. is not prior art as to the present application because Kanevsky, et al. and this application are assigned to the same

corporation, IBM Corporation. Applicants submit that the filing of the present application on June 27, 2000, brings the subject application under the rubric of the amendments made to the Patent Law in the American Inventors Protection Act of 1999. That Act, enacted November 29, 1999, amends 35 U.S.C. §103(c) such that subject matter developed by another person which qualifies as prior art under 35 U.S.C. §102(e) does not preclude patentability where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an application of assignment to the same person.

That this section applies to the instant application is established by the Guidelines concerning the implementation of changes to 35 U.S.C. §§102(g) and 103(c) published in the Official Gazette on April 11, 2000. Those Guidelines includes the statement that the amendment to 103(c) applies to all utility, design and plant patent applications filed on or after November 29, 1999, including continuing applications filed under 37 C.F.R. §1.53(d), continued prosecution applications filed under 37 C.F.R. §1.53(b) and reissues. In view of the filing of the present application on June 27, 2000, Applicants benefit from the statutory restraints imposed in the amendment to §103(c).

That the claims of the present application are patentable over the rejection of record is established by the fact that Kanevsky, et al. is, on its face, assigned to International Business Machines. The instant application is also assigned to International Business Machines. The Assignment of the instant application to International Business Machines by the Applicants of the present application was mailed June 27, 2000, to the USPTO for recording. The Assignment was recorded by the USPTO on June 27, 2000 at Reel 010917, Frame 0132.

U.S. Patent 6,421,453 to Kanevsky, et al. issued July 16, 2002. The present application is entitled to the benefit of the filing date of June 27, 2000. As such, the outstanding rejection of

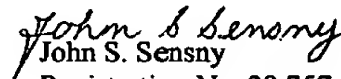
Claims 4-6, 9, 14-16, 21 and 22 of the present application applies the Kanevsky, et al. patent predicated upon its availability as a reference under 35 U.S.C. §102(e) in that this is the only subsection of 35 U.S.C. §102 whose requirements are met by this patent.

In view of the requirements of 35 U.S.C. §103(c), as amended November 29, 1999, which apply to the instant application, the Kanevsky, et al. reference cannot preclude patentability under 35 U.S.C. §103, the section upon which Claims 4-6, 9, 14-16, 21 and 22 of the present application have been rejected. Thus, these claims of the present application are patentable over the outstanding rejection of record. Reconsideration and removal of this ground of rejection is therefore deemed appropriate. Such action is respectfully urged.

For the reasons advanced above, the Examiner is asked to enter this Amendment, to reconsider and to withdraw the rejections of Claims 1-22 under 35 U.S.C. §103, and to allow these claims. If the Examiner believes that a telephone conference with Applicants' Attorneys would be advantageous to the disposition of this case, the Examiner is asked to telephone the undersigned.

Applicant also encloses a copy of a "Version with Markings Showing Changes Made", indicative of the amendments which have been implemented to the present application and to facilitate the Examiner's review thereof.

Respectfully submitted,


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"VERSION WITH MARKINGS SHOWING CHANGES MADE"**THE CLAIMS:**

Claims 1, 8, 10 and 17 have been amended as follows:

--1. (Twice Amended) An information input processing computer system for mapping gestures to keys of a virtual keyboard, the system comprising one or several cameras, one or more memories with CPU connected to the cameras, and processes running in the CPU that associates gesture movements with typing and produce gesture associated textual output, wherein said processes capture gesture images, classify [groups of gestures into] each gesture image into one of a plurality of classes depending on the movement of the gesture, and associate each of the classes with one of the keys of the virtual keyboard.

8. (Twice Amended) The method for producing a textual output in which a user makes typing like gestures without the presence of a keyboard and the gestures are associated with the most probable keys that would be typed if a keyboard were presented, said method including the steps of using a computer system to map gestures to keys of a virtual keyboard, including the step[s] of running processes on the computer to capture gesture images, [classifying groups of gestures into] to classify each gesture image into one of a plurality of classes depending on the movement of the gesture, and to associate each of the classes with one of the keys of the virtual keyboard.

10. (Twice Amended) A method of typing using a virtual keyboard having a multitude of virtual keys, comprising the steps:

making typing gestures without any real keyboard;

sensing the typing gestures; and

producing, from the sensed typing gestures, gesture associated textual output including the step of running processes on a computer to capture gesture images, classify [groups of gestures into] each gesture image into one of a plurality of classes to classify each gesture image into one of a plurality of, and to associate each of the classes with one of the virtual keys of the virtual keyboard.

17. (Twice Amended) A typing system using a virtual keyboard, comprising means for sensing typing gestures made without any real keyboard; and

means for producing, from the sensed typing gestures, gesture associated textual output said producing means including a computer and processes running on the computer to capture gesture images, [classifying groups of gestures into] to classify each gesture image into one of a plurality of classes, and associate each of the classes with one of the keys of the virtual keyboard.